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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/536,637	05/27/2005	Josephus Arnoldus Henricus Maria Kahlman	NL021265	2471

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EXAMINER	
JUNG, UNSU	

ART UNIT	PAPER NUMBER
1641	

DATE MAILED: 09/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/536,637	KAHLMAN ET AL.	
	Examiner	Art Unit	
	Unsu Jung	1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 June 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 May 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicants' amendments to cancel claims 9-13 and amend claims 1-8 in the reply filed on June 26, 2006 have been acknowledged and entered.

2. Claims 1-8 are pending.

Drawings

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description:

- reference characters "A: ΔC, ΔL, ΔR" and "B: Δmass" in Fig. 1;
- reference characters "A: ΔC, ΔL" and "B: Δmass" in Fig. 10.

Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be

notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Applicant's arguments, see p5, filed on June 26, 2006, with respect to the objection of Fig.'s 4 and 6 have been fully considered and are persuasive. The objection of Fig.'s 4 and 6 has been withdrawn.

Applicants' arguments with respect to Fig.'s 1 and 10 are not found persuasive. Although the terms ΔC, ΔL, ΔR, and Δmass, which indicate change in capacitance, inductance, resistance, and mass, specification fails to provide any reference to "A: ΔC, ΔL, ΔR" and "B: Δmass" of Fig.'s 1 and 10 and it is unclear how "A: ΔC, ΔL, ΔR" and "B: Δmass" are related to the schematic drawings of the device of the claimed invention. Therefore, the objection of the drawings with respect to Fig.'s 1 and 10 is maintained.

Objections Withdrawn

4. Applicant's arguments, see p5, filed on June 26, 2006, with respect to the objection of the specification have been fully considered and are persuasive. The objection of the specification has been withdrawn.

5. Applicant's arguments, see p6, filed on June 26, 2006, with respect to the objection of claims 1, 3, 4, 8, and 12 have been fully considered and are persuasive. The objection of claims 1, 3, 4, 8, and 12 has been withdrawn in light of amended claim 1 and canceled claim 12 in the reply filed on June 26, 2006.

6. Applicant's arguments, see p6, filed on June 26, 2006, with respect to the rejection under 35 U.S.C. 112, second paragraph have been fully considered and are persuasive. The rejection of claim 12 under 35 U.S.C. 112, second paragraph has been withdrawn in light of canceled claim 12 in the reply filed on June 26, 2006.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. In claim 1, the term "a resonance frequency determining sensor element" in lines 5-7 is vague and indefinite. It is unclear whether or not the phrase "a resonance frequency determining sensor element" is referring to "a sensor element" in line 1. Although Applicants clarified that the term "resonance frequency determining defines the sensor element in the reply filed on June 26, 2006, the currently recited claim remains unclear as the term "a resonance frequency determining sensor element" in lines 5-7 fails to clearly make a reference to "sensor element" in line 1.

10. In claim 1-8, all the terms within parentheses throughout the claim are vague and indefinite as the terms within the parentheses fails to positively limit the claim and it is not clear whether or not the limitation(s) within the parentheses are part of the claimed invention. Applicants failed to address the rejection of claims 1-8 under 35 U.S.C. 112, second paragraph with respect to the use of parentheses. Therefore, the rejection of claims 1-8 under 35 U.S.C. 112, second paragraph with respect to the use of parentheses has been maintained.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

14. Claims 1, 4, 5, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oyama et al. (U.S. Patent No. 5,552,274, Sept. 3, 1996) in view of Ruile et al. (U.S. Patent No. 6,084,503, July 4, 2000).

Oyama et al. teaches a device (quartz crystal microbalance, QCM) comprising a sensor element connected to an external oscillating circuit are adapted to resonate with the frequency inherent in the quartz plates (column 1, line 64-column 2, line 3). This frequency is related to the mass of quartz as well as the mass, viscosity and viscoelasticity of the electrodes, which are in contact with the quartz. Generally, the variation of resonant frequency and that of mass of a substance in contact with quartz are correlated. This device provide for both DNA detection and quantitative measurement of test DNA in a sample on the basis of the variation in resonance frequency (column 2, lines 43-57). However, Oyama et al. fails to teach a device comprising a remote power transmission element for receiving a resonant frequency.

Ruile et al. teaches a radio-interrogated surface wave technology sensor (Abstract), wherein a radiofrequency transmitter and receiver having transmission and reception antennas is used for qualitative/quantitative evaluation of a change in the response of the surface-wave sensor and for receiving power transmitted from a remote radiofrequency transmitter (column 2, lines 30-50).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include in the device of Oyama et al. with a radiofrequency transmitter and receiver having transmission and reception antennas as taught by Ruile et al. in order to provide a remote power source and interrogation device for DNA detection and quantitative measurement of test DNA in a sample on the basis of the variation in resonance frequency.

With respect to claims 4 and 5, Oyama et al. teaches a sensor element, which forms a part of the resonance frequency circuit (column 1, line 64-column 2, line 3), wherein the sensor element.

With respect to claim 8, Oyama et al. teaches a prior art teaching a sensor element formed on the surface of a on-chip SAW resonator can be used for detection of DNA (column 2, lines 26-32). It would have been obvious to one of ordinary skill at the time of the invention to include in the Oyama et al. to include in the device comprising an array of sensor elements with a SAW resonator for use in DNA detection assays.

15. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oyama et al. (U.S. Patent No. 5,552,274, Sept. 3, 1996) in view of Ruile et al. (U.S. Patent No.

6,084,503, July 4, 2000) as applied to claim 1 above, and further in view of Hirt (U.S. Patent No. 5,926,301, July 20, 1999).

Oyama et al. in view of Ruile et al. teaches a device as discussed above. However, Oyama et al. in view of Ruile et al. fails to teach a device, wherein the remote power transmission element comprises a photodiode.

Hirt teaches remote devices, such light emitting diodes and photodiodes, which are usually smaller than radio-frequency antennae (column 1, lines 26-43).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include in the device of Oyama et al. in view of Ruile et al. with a photodiode as a remote power transmission element as taught by Hirt in order to use a remote power transmission element smaller than radio-frequency antennas to be incorporated in the device of Oyama et al. in view of Ruile et al.

With respect to claim 8, Oyama et al. teaches sensor elements located on a surface of an on-chip Surface Acoustic Wave (SAW, column 2, lines 26-32).

16. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oyama et al. (U.S. Patent No. 5,552,274, Sept. 3, 1996) in view of Ruile et al. (U.S. Patent No. 6,084,503, July 4, 2000) as applied to claim 1 above, and further in view of Ishikawa et al. (WO 00/66781, Nov. 9, 2000).

Oyama et al. in view of Ruile et al. teaches a device for detecting biomolecules in samples as discussed above. However, Oyama et al. in view of Ruile et al. fails to teach a device, wherein the remote power transmission element in the device comprises a coil

for receiving RF power whereby the remote power transmission element is arranged for receiving an RF frequency different from the resonant frequency.

Ishikawa et al. teaches a wireless power transmitting element (external control station) for transmitting power to another wireless power transmitting element in a circuit provided in a biosensor device (p15, lines 3-17 and Fig. 11). The power is transported either by radiofrequency (RF) radiation or by magnetic coupling between the control system antenna/coil and the biosensor antenna/coil. Using the RF transmissions, the biosensor can be interrogated individually, or as groups (p14, line 27-p15, line 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include in the system of Oyama et al. in view of Ruile et al. with a remote power transmitting element comprising a coil as taught by Ishikawa et al. in order to wirelessly transmit power to a biosensor device to interrogate individual or groups of biosensors.

17. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oyama et al. (U.S. Patent No. 5,552,274, Sept. 3, 1996) in view of Ruile et al. (U.S. Patent No. 6,084,503, July 4, 2000) as applied to claims 1 and 4 above, and further in view of Hardman et al. (U.S. Patent No. 6,592,820, Filed Nov. 5, 1998).

Oyama et al. in view of Ruile et al. teaches a device as discussed above. However, Oyama et al. in view of Ruile et al. fails to teach a device, wherein the sensor element (71) is magnetoresistive element provided in a bridge configuration.

Hardman et al. teaches that a conventional biochemical assay may include a detection of microscopic paramagnetic particles (PMPs) bound to a GMR sensor by specific intermolecular recognition bonds (column 1, lines 34-37). PMPs are detected as a difference in the resistance of a GMR sensor having a bound PMP compared to a reference GMR sensor having no bound PMP (column 1, lines 37-40). A plurality of sensors is arranged in an array coupled to a differential amplifier (column 2, lines 32-34). Each addressed cell is coupled in a bridge circuit to the differential amplifier, which provides a signal, which is in the form of frequency and conveys indicia of the resistance of each sensor. For proper operation, GMR elements require a current passing through the respective elements (column 17, lines 20-24).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to include in the device of Oyama et al. in view of Ruile et al. with a GMR sensor comprising GMR elements coupled to a bridge circuit as taught by Hardman et al. in order to provide GMR sensor with power via wireless power transmitter for conducting biochemical assays using microscopic paramagnetic particles.

Response to Arguments

18. Applicants' arguments filed on June 26, 2006 have been fully considered but they are not persuasive.

Applicants argue that Ruile et al. fails to teach the feature of the resonance frequency of an RF communication device, which is affected by the sensor recited in

claim 1. This argument is not found persuasive as Ruile et al. teaches an RF communication device, which includes a radiofrequency transmitter and receiver having transmission and reception antennas. In the rejection under 35 U.S.C. 103(a) as being unpatentable over Oyama et al. in view of Ruile et al., the RF communication device of Ruile et al. is employed in the device of Oyama et al. in order to remotely provide power to the sensor device of Oyama et al. and remotely receive signals (frequency) generated by the sensor upon binding of a biomolecule as discussed above. Upon binding of a biomolecule to the sensor, a change in resonance frequency would be received by the RF communication device of Ruile et al. Therefore, the feature of the resonance frequency of an RF communication device is affected by the sensor is taught by the combined teachings of Oyama et al. and Ruile et al.

Since prior art fulfills all the limitations currently recited in the claims, the invention as currently recited would read upon the prior art.

Conclusion

19. No claim is allowed.

20. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Unsu Jung whose telephone number is 571-272-8506. The examiner can normally be reached on M-F: 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on 571-272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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